NON-PUBLIC?: N
ACCESSION #: 8808170335
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Byron, Unit 2 PAGE: 1 of 3

DOCKET NUMBER: 05000455

TITLE: Thermal Binding of Steam Generator Preheater Bypass Valves Resulting in Low Steam Generator Level Reactor Trip
EVENT DATE: 07/15/88 LER #: 88-009-00 REPORT DATE: 08/09/88

OPERATING MODE: 2 POWER LEVEL: 002

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: L. Sues, Assistant Superintendent Technical Services
TELEPHONE #: 815-234-5441 Ext. 2214

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: SJ COMPONENT: V MANUFACTURER: A391
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On July 15, 1988, Byron Unit 2 reactor power was 2 percent. At 0436 a Nuclear Station Operator (NSO) attempted to open the Steam Generator Preheater Bypass Valves (2FW039A,B,C,D) to feed the Steam Generators (S/G's). The A and D valves opened properly, but the B and C valves failed to open as demanded. The levels in the 2B and 2C S/G's lowered to the low-low level reactor trip setpoint at which point the reactor automatically tripped. The licensed operators entered and complied with emergency operating procedures. Stable plant conditions were achieved in Hot Standby at 0500.

The event was caused by the failures of valves 2FW039B and 2FW039C to open on demand. These valves need to be open to provide sufficient feedwater flow to the S/G's at 1 to 2 percent reactor power. The level instabilities induced by the valve failures made level control difficult. Investigation revealed that the valves had become thermally bound following their automatic closure during a reactor trip event on July 14, 1988.

Both valves were opened using hydraulic lifts and 2FW039C operated properly,

however, 2FW039B still would not open when demanded by the handswitch. A non-safety related air check valve was replaced and the 2FW039B valve operated properly.

A previous similar occurrence was reported in Unit 2 Licensee Event Report 88-007.

(End of Abstract)

A. PLANT CONDITIONS PRIOR TO EVENT:

Event Date/Time 7/15/88 / 0436

Unit 2 MODE 2 - Startup Rx Power 2%
RCS (AB) Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of this event that contributed to the event. On July 15, 1988, Byron Unit 2 was in the Startup Operational Mode (Mode 2) with reactor power at 2 percent. At 0436 a Nuclear Station Operator (NSO) (licensed reactor operator) attempted to open the Steam Generator Preheater Bypass Valves (SJ) (2FW039A,B,C,D) to feed the Steam Generators (S/G's). The 2FW039A and 2FW039D valves opened properly, but the 2FW039B and 2FW039C valves failed to open as demanded. The NSO isolated the blowdown flow paths from the 2B and 2C S/G's in an effort to slow the rate of level decrease in the S/G's. The levels in the 2B and 2C S/G's continued to lower. As the low-low level reactor trip setpoint (17%) was approached and it was evident that levels could not be restored, a licensed Senior Reactor Operator directed the NSO to manually trip the reactor, however the Reactor Protection System initiated an automatic reactor trip due to low-low level in the 2C S/G before the manual trip was accomplished. The licensed operators entered and complied with the "Reactor Trip or Safety Injection-Unit 2 Emergency Operating Procedure" (2BEP-0) and the "Reactor Trip Response Unit 2 Emergency Operating Procedure" (2BEP ES-0.1). The 2A and 2B Auxiliary Feedwater Pumps (AFP) (BA) automatically started due to the low-low S/G level condition as expected. An expected Feedwater Isolation occurred due to the opening of the reactor trip breakers coincident w
th low average reactor coolant
temperature (T(avg)) of 564 degrees F.

At 0446 the 2B AFP was stopped since its operation was not required to

maintain S/G levels. At 0451 the Feedwater Isolation signal was reset. At 0454 the Startup Feedwater Pump was started and flow was established to the S/G's. At 0455 the 2A AFP was stopped. At approximately 0500 the stable plant conditions were achieved in Hot Standby (Mode 3). Valves 2FW039B and 2FW039C were declared inoperable and Technical Specification Limiting Condition for Operation Action Requirement (LCOAR) 3.6.3 for the two containment isolation valves was entered and satisfied.

This Licensee Event Report (LER) is submitted in accordance with 10CFR50.73 (a)(2)(iv) due to the automatic Reactor Protection System and Engineered Safety Features (ESF) actuations.

C. CAUSE OF EVENT:

The event was caused by the failures of valves 2FW039B and 2FW039C to open on demand. At 1 to 2 percent reactor power the Preheater Bypass Valves must be open to provide sufficient feedwater flow to maintain S/G levels. The Byron Unit 2 S/G's are Westinghouse Model D-5. The shrink/swell phenomena are most pronounced at low power, and Unit 2 was at 2 percent reactor power at the time of the event. The level instabilities induced by the failure of the 2FW039B and 2FW039C valves made control of the S/G levels difficult. The licensed operator's actions were in accordance with Station Operating Procedures and operating strategies for D-5 S/G level control.

The 2FW039B and 2FW039C valves were found to be thermally bound. The valves had automatically closed when Unit 2 tripped on July 14, 1988 (see Unit 2 LER 88-008). Normally, the valves are manually closed during a controlled shutdown of the plant. A controlled shutdown does not close the Preheater Bypass Valves at such high feedwater temperatures.

D. SAFETY ANALYSIS:

The event occurred when the majority of Feedwater Isolation Valves were already closed. All ESF systems actuated and functioned as designed. The S/G levels were reestablished and the Unit stabilized operations in Mode 3. The Failed Preheater Bypass Valves failed in their safe position. Neither plant nor public safety were affected by this event.

E. CORRECTIVE ACTIONS:

The 2FW039B valve was uncoupled from its actuator. The actuator was found

to be operating correctly. The 2FW039B and 2FW039C were then opened using hydraulic lifts. The 2FW039C stroked properly. The 2FW039B did not operate properly from the control switch. The problem was isolated to a non-safety related air check valve for the "C" solenoid. The air check valve was replaced and the 2FW039B stroked properly when demanded from the handswitch. The valves were successfully tested and returned to operable status. Technical Specification LCOAR 3.6.3 for the failed valves was exited at 1838 on July 15, 1988. In addition, applicable operating procedures will be reviewed for the possible inclusion of a step to stroke the Preheater Bypass Valves subsequent to a reactor trip. This may prevent thermal binding of the type that was experienced during this event. This proposed corrective action is tracked by Action Item Record 454-225-88-0158.

The Preheater Bypass Valves have not thermally bound following a normal unit shutdown. No further corrective action is planned at this time.

F. PREVIOUS OCCURRENCES:

LER NUMBER TITLE

88-007 Feedwater Isolation Actuation due to S/G
Preheater Bypass Valve Failure to Open

G. COMPONENT FAILURE DATA:

a) MANUFACTURER NOMENCLATURE MODEL NUMBER MFG PART NUMBER

Strataflo Products 1/2-inch NPT
Check Valve

ATTACHMENT # 1 TO ANO # 8808170335 PAGE: 1 of 1

Commonwealth Edison
Byron Nuclear Station
4450 North German Church Road
Byron, Illinois 61010

August 9, 1988

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report from Byron Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv).

This report is number 88-009; Docket No. 50-455.

Sincerely,

/s/ ILLEGIBLE
for R. Pleniewicz
Station Manager
Byron Nuclear Power Station

Enclosure: Licensee Event Report No. 88-009-00

cc: A. Bert Davis, NRC Region III Administrator
P. Brochman, NRC Senior Resident Inspector
INPO Record Center
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Ltr: BYRON 88-0842

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